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(56) Documents Cited

GB1210419 A

EP 0010733 A

JP 040062203 A

US 5287811 A

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(54) Abstract Title

**Trackway for personal rapid transport systems**

(57) The trackway comprises longitudinally adjacent trackway sections 1, each comprising a pair of parallel hollow steel side beams 4, 6 interconnected by spaced hollow steel cross members 2. The cross members 2 support a pair of reinforced concrete track members 10, 12 which provide running surfaces of the trackway. The trackway can be at ground level, or elevated using longitudinally spaced hollow columns 24, each supporting ends of adjacent sections via a support plate 22 and resilient elements 26, 28.

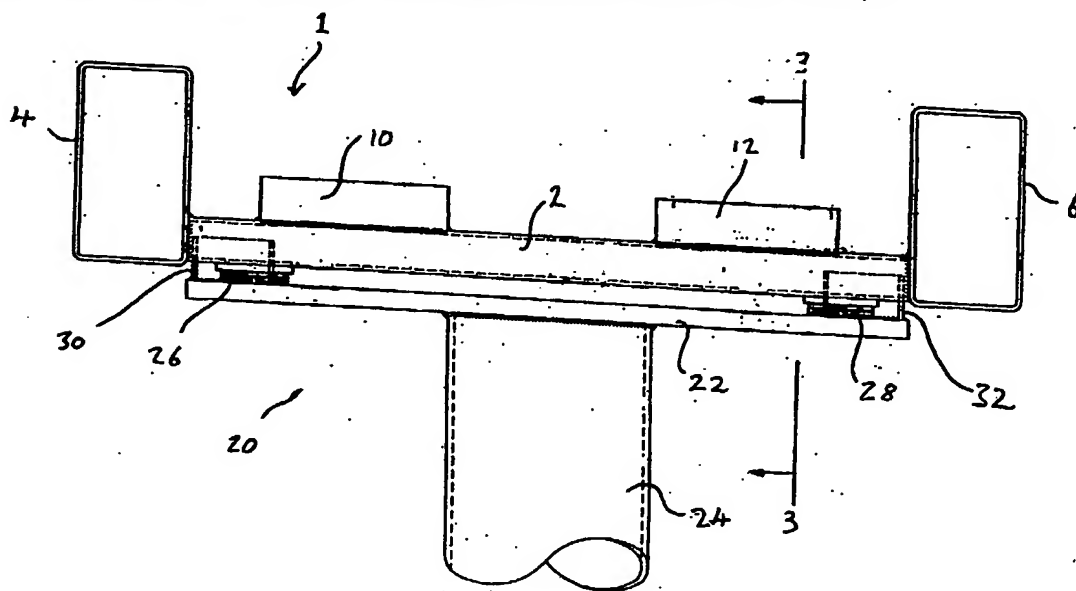
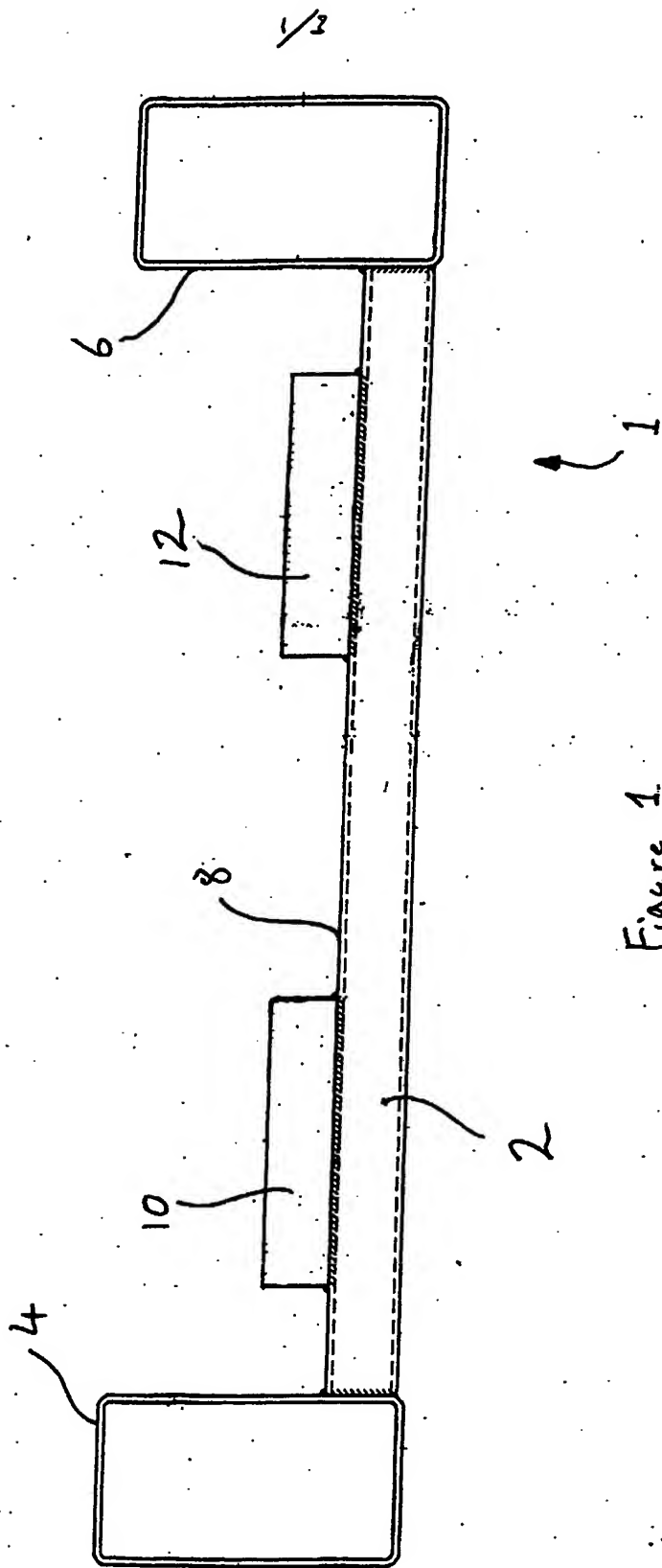


Figure 2

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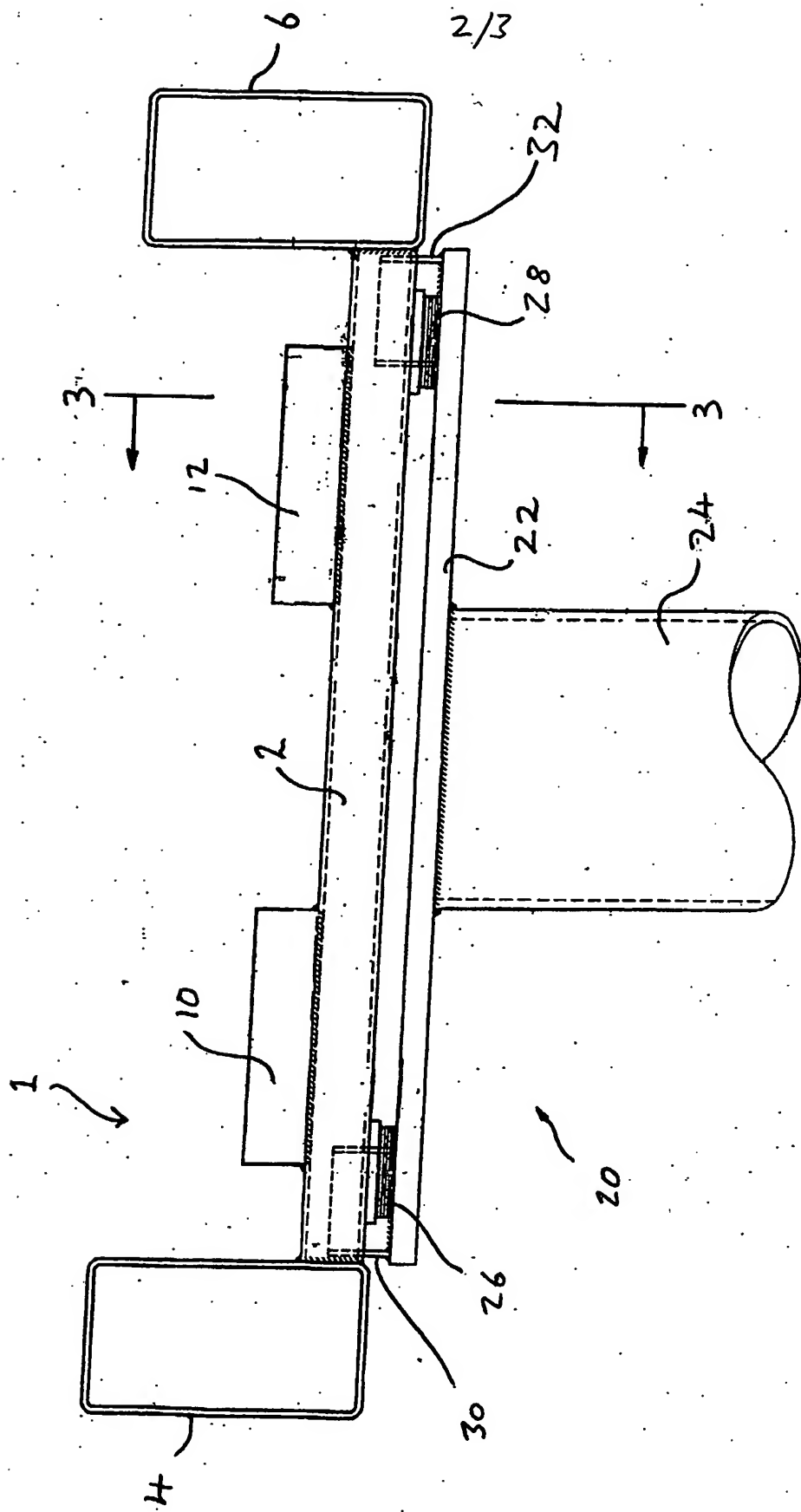
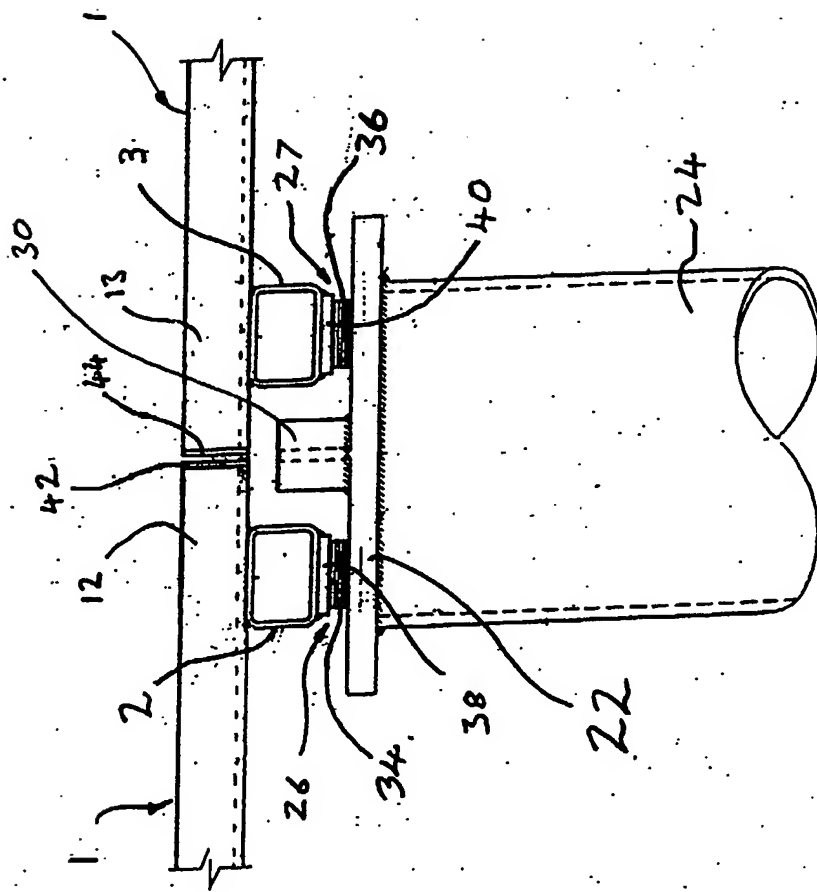


Figure 2



TRACKWAY FOR PERSONAL RAPID TRANSPORT SYSTEMS

This invention relates to the design of a trackway in a personal rapid transport system.

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In general, a personal rapid transport (PRT) system comprises a dedicated trackway on which individual vehicles travel between stations. Each vehicle contains only one passenger or group of passengers, and the vehicle travels continuously between the starting point and the destination without stopping at any intermediate stations. PRT systems thus provide a compromise between a conventional mass transport system such as buses, trains and metro systems, and individual passenger cars.

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Typical PRT systems use a rail system to provide guidance for the vehicles. This may be a monorail or dual rail, and points similar to standard railway points are used to direct the vehicles at junctions. An example of such a system is disclosed in US 5,778,796.

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An example of an alternative PRT system is disclosed in US 4,061,089. In this system each vehicle is supported by air bearings in such a way that an air gap is maintained between the vehicle and the trackway. Vehicle propulsion is provided by a linear synchronous motor, the primary circuit of which is embedded in the trackway to activate a pair of linear induction motors located on the vehicle.

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In both of the above systems, the cost of constructing the trackway is a substantial barrier to implementing the system. Also, to be acceptable, the trackway of a

PRT system must require little urban space and must have minimal visual intrusion.

According to the present invention there is provided a  
5 trackway for a personal rapid transport system, the  
trackway comprising a plurality of longitudinally  
adjoining trackway sections, each section comprising a  
pair of parallel side beams interconnected by spaced  
10 cross-members which support a pair of elongate track  
members extending parallel to the side beams, the track  
members providing running surfaces of the trackway, the  
side beams and the cross members comprising hollow  
steel structural members and the track members  
comprising preformed reinforced concrete members.

15 In a preferred embodiment in accordance with the  
present invention the side beams of the trackway have  
generally rectangular cross sections. The cross members  
may also be generally rectangular in cross section, and  
20 may be connected to the side beams at the lower regions  
of the side beams, whereby the side beams form side  
walls which extend upwardly from the cross members.

Preferably the track members have flat upper surfaces  
25 acting as running surfaces on which the wheels/tyres of  
the vehicles of the PRT system run. The track members  
may have a generally rectangular cross section, and are  
preferably spaced inwardly from the side beams, for  
example by a distance of not less than 100mm.

30 The trackway may be situated at ground level or in a  
cutting. Alternatively, the trackway may be elevated,  
in which case the trackway sections may be supported by  
one or more supports, each comprising a column anchored

into the ground. Adjoining trackway sections preferably meet at the column.

5 It is desirable for several reasons for the trackway of a PRT system to be elevated above ground level where appropriate. This minimises obstruction to existing road traffic, but also reduces severance by the trackway member. That is, an elevated trackway does not provide a barrier to vehicles and pedestrians  
10 wishing to cross from one side of the trackway to the other. Elevating the trackway avoids the need for expensive bridges and/or underpasses.

15 Resilient supporting elements may be provided to support the trackway sections, and may be made from a material such as neoprene. Stop means may be provided, for limiting the lateral displacement of the trackway sections in relation to the support.

20 In a preferred embodiment, the side beams extend above the running surfaces, for example to a level not less than 200mm above the running surface. The total width of the trackway is preferably not more than 3 metres, and the width between side beams not more than 2  
25 metres.

A trackway in accordance with the present invention can be constructed to be minimally visually intrusive, since the width and height can be relatively small in  
30 comparison with known trackways. Additionally, the structure is relatively simple and inexpensive to construct.

For a better understanding of the present invention and to show more clearly how it may be carried into effect, reference will now be made by way of example to the accompanying drawings, in which:-

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Figure 1 is a partial cross section of a one-way trackway.

Figure 2 is a cross section view of the trackway of Figure 1 mounted on a support.

Figure 3 is a cross section view taken from the line 3-3 of Figure 2.

15 The trackway shown in the Figures comprises a series of trackway sections 1 laid end-to-end as shown in Figure 3. Each section 1 comprises a plurality of spaced-apart parallel cross members, each comprising a hollow, thin walled rectangular cross section steel beam with rounded corners, extending laterally across the width of the trackway (see also Figure 3). The cross members 2 extend between side beams 4, 6. The side beams 4, 6 are identical thin walled rectangular cross-section steel members which extend along the sides of the track section 1. The vertically extending innermost side wall of each side beam 4, 6 is welded to the cross members 2 at the base of the side wall. Accordingly, the side beams each extend vertically above the cross members 2. In the embodiment shown, the vertical dimensions of the cross members 2 and the side beams 4, 6 are 100 mm and 450 mm respectively.

First and second track members 10, 12 are secured to the upper surfaces 8 of the cross members 2, and spaced



upwardly from the side beams 4, 6. The track members 10,12 are secured either by edge clamping or retaining bolts (not shown). Alternatively, the undersurface of the track members 10,12 may be provided with a profile which is matched by the cross members 2 so as to restrain the track members 10,12 in position.

In the embodiment shown, the distance between each track member 10, 12 and the adjacent side beam 4, 6 is 160 mm. The track members 10, 12 are of rectangular cross-section having dimensions, in the embodiment shown, of 430 x 100 mm. The upper surfaces of the track member 10, 12 are flat and provide first and second running surfaces 3, 5 respectively. The track members 10, 12 extend longitudinally along the trackway, parallel to the side beams 4, 6 and perpendicular to the cross members 2.

Referring now to Figure 2, the track section 1 is shown in position on a support shown generally at 20. The support 20 comprises a support plate 22 of similar transverse width to the cross members 2. The support plate 22 extends horizontally across, and is supported centrally on, a column 24. The column 24 is a thin walled cylinder and is welded at its top end to the lower face of the support plate 22. The lower end of the column 24 is supported by the ground in a suitable foundation.

The columns 24 are spaced apart along the trackway by the length of each trackway section 1 (for example, 30 metres), so that each column supports the adjoining ends of successive trackway sections 1, as shown in

Figure 3. The resulting trackway may be, for example, 8 metres above ground level.

The trackway sections 1 are supported on the support plates 22 by means of resilient elements 26, 28. These resilient elements 26, 28 are located on the upper surface of the support plate 22 close to the lateral edges of the support plate 22. As seen in Figure 3, two pairs of the support members 26, 27 are spaced longitudinally along the trackway from each other. Each support 26, 27 comprises a resilient portion, for example of neoprene, fixed to the upper surface of the support plate 22 at their lower end and provided with rigid plates 38, 40 at their upper end. The plates 38, 40 are attached to and support the respective endmost cross members 2 of the trackway sections 1.

Stops 30, 32 are provided on the upper surface of the support plate 22, and project between the endmost cross members 2 of the track sections. Each stop 30, 32 comprises a short I-beam section extending upwardly from the support plate 22. The stops are spaced a short distance from the respective side beams 4, 6.

As shown in Figure 3, track members 12 and 13 of adjacent track sections 1 terminate at end plates 43, 44. An expansion gap is provided between the end plates 42, 44. In this way a substantially continuous track member is provided, along which the wheels of the vehicles of the PRT system can travel.

The resilient supports 26, 27, 28 allow a small amount of relative movement between the track sections 1 and the support 20 to insulate the track sections from

earth tremors. The stops 30, 32 prevent excessive lateral movement of the track sections 1 on the support 20, by abutting the lower portions of the side walls of the side beams 4, 6. The stops 30, 32 are positioned  
5 so that they can each engage the side beams 4, 6 of two adjacent trackway sections 1.

In the embodiment shown, the overall width of the trackway is 2.2 metres, the width between the side  
10 beams 4, 6 being 1.7 metres. The side beams 4, 6 have a height which is less than 0.5 metre, with the result that the overhead section of trackway has very low visual intrusion.

CLAIMS

1. A trackway for a personal rapid transport system, the trackway comprising a plurality of longitudinally adjoining trackway sections, each section comprising a  
5 pair of parallel side beams interconnected by spaced cross-members which support a pair of elongate track members extending parallel to the side beams, the track members providing running surfaces of the trackway, the side beams and the cross members comprising hollow  
10 steel structural members, and the track members comprising preformed reinforced concrete members.
2. A trackway as claimed in claim 1 wherein the side beams are of generally rectangular cross section.  
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3. A trackway as claimed in claim 1 or 2 wherein the cross members are of generally rectangular cross section.
- 20 4. A trackway as claimed in any one of the preceding claims, wherein the track members have flat upper surfaces acting as running surfaces.
5. A trackway as claimed in any one of the preceding  
25 claims, wherein the track members have a generally rectangular cross section.
6. A trackway as claimed in any one of the preceding claims, wherein the cross members are connected to the  
30 side beams at the lower regions of the side beams, whereby the side beams form side walls which extend upwardly from the cross members.

7. A trackway as claimed in any one of the preceding claims, wherein the track members are spaced inwardly from the side beams.

5 8. A trackway as claimed in claim 7, wherein the track members are spaced from the adjacent side beams by a distance of not less than 100mm.

10 9. A trackway as claimed in any one of the preceding claims wherein at least one of the trackway sections is supported on a support plate.

15 10. A trackway as claimed in claim 9, wherein a resilient element is provided between the support plate and one of the cross members of the or each supported track section.

20 11. A trackway as claimed in claim 10, wherein stop means is provided for limiting lateral displacement of the trackway relative to the support plate.

25 12. A trackway as claimed in any one of claims 8 to 10 wherein the support plate is provided on a column to elevate the trackway.

13. A trackway as claimed in claim 12 wherein adjoining trackway sections meet at the column.

30 14. A trackway as claimed in any one of the preceding claims, wherein the side beams extend above the running surfaces.

15. A trackway as claimed in any one of the preceding claims, wherein the total width of the trackway is less than 3 metres.

5 16. A trackway as claimed in any one of the preceding claims wherein the width between side beams is less than 2 metres.

10 17. A trackway as claimed in any one of the preceding claims, wherein the overall height of the or each track section is not greater than 0.5 metre.

18. A trackway as described herein with reference to, and as shown in, the accompanying drawings.

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19. A personal rapid transport system comprising a trackway as claimed in any one of the preceding claims.

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**Claims searched:** 1-19

**Examiner:** Roger Binding  
**Date of search:** 19 February 2003

## Patents Act 1977 : Search Report under Section 17

### Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
A		EP 0010733 A (PARAZADER), see especially Fig 5 and page 6, line 13 onwards.
A		GB 1210419 A (SOC. DE L'AEROTRAIN)
A		JP 040062203 A (HITACHI KASADO), see abstract and drawings.
A		US 5287811 A (RAILWAY TECH. RES. INST.), see especially Fig 7 and column 4, line 5 onwards.

### Categories:

X Document indicating lack of novelty or inventive step	A Document indicating technological background and/or state of the art.
Y Document indicating lack of inventive step if combined with one or more other documents of same category.	P Document published on or after the declared priority date but before the filing date of this invention.
& Member of the same patent family	E Patent document published on or after, but with priority date earlier than, the filing date of this application.

### Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>v</sup>:

B7L

Worldwide search of patent documents classified in the following areas of the IPC<sup>7</sup>:

B61B; E01B

The following online and other databases have been used in the preparation of this search report:

Online WPI EPODOC JAPIO